भारतीय मानक
Indian Standard

IS 16171 : 2014
(Reaffirmed 2019)

विनियर परतदार लम्बर — विशिष्टि

Veneer Laminated Lumber — Specification

ICS 790.060.20

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Wood and Other Lignocellulosic Products Sectional Committee, CED 20

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Wood and Other Lignocellulosic Products Sectional Committee had been approved by the Civil Engineering Division Council.

Conventionally timber has been one of the most commonly used material in making furniture and door, window and ventilator frame and shutters. With scarce availability of timber from natural forests, there is an increased dependence on use of plantation timber in such applications. Plantation timber however, being of short rotation species are dimensionally less stable than timber species from natural forests and are generally liable to warp and twist. To overcome these problems finger jointing, edge laminating and cross bonding techniques are being adopted while using plantation timber species.

Veneer laminated lumber (VLL) is a composite material from plantation timber species which adopts the finger jointing-edge lamination technique, overlaid with veneers and have improved dimensional stability and aesthetics. Further, finger jointing and edge lamination minimizes wastage and improves utilization of timber as even small pieces of wood can be effectively utilized in this process. VLL has application in all areas were traditionally timber has been used. As the construction parameters of VLL are different from that of other products made from timber, a need was felt to formulate a standard on VLL that would facilitate its use in various applications.

A scheme of labelling environment friendly products to be known as ECO-Mark has been introduced at the instance of the Ministry of Environment and Forests (MoEF), Government of India. The ECO-Mark shall be administered by the Bureau of Indian Standards (Bureau of Indian Standards) under the *Bureau of Indian Standards Act*, 1986 as per the Resolution No. 71 dated 21 February 1991 and Resolution No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for ECO-Mark, it shall also carry the Standard Mark of the BIS besides meeting additional environment friendly requirements. For this purpose the Standard. Mark of BIS would be a single mark being a combination of the ISI Mark and the ECO logo. Requirements to be satisfied for a product to qualify for the BIS Standard Mark for eco-friendliness shall be optional; manufacturing units shall be free to opt for ISI Mark alone also. ECO criteria is based on the Gazette Notification No. 170 dated 18 May 1996 for Wood Substitutes as Environment Friendly Products published in the Gazette of Government of India.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard, is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

VENEER LAMINATED LUMBER — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements of veneer laminated lumber (VLL) of minimum density of 0.6 g/cm^3.

1.2 Its application includes all the end uses to which timber has been traditionally used such as in furniture and in door, window and ventilator frames and shutters.

2 REFERENCES

The standards listed in Annex A contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 707 and the following shall apply.

3.1 Veneer Laminated Lumber — A composite made by using finger jointed and edge laminated timber overlaid with veneers with suitable adhesive (*see* Fig. 1).

4 MATERIALS

4.1 Timber

Any plantation timber treated and seasoned shall be used for processing veneer laminated lumber.

4.2 Veneers

4.2.1 Veneers of required thickness shall be obtained from timber logs grown in plantations outside the natural forest system, such as rubber wood, silver oak, eucalyptus, poplar, acacia, etc.

4.2.2 Veneers shall be free from knot holes, decayed knots, borer holes and shakes and cross grains exceeding one in ten shall not be permitted. The nominal thickness of all the veneers used shall be identical and uniform within a tolerance of ± 10 percent.

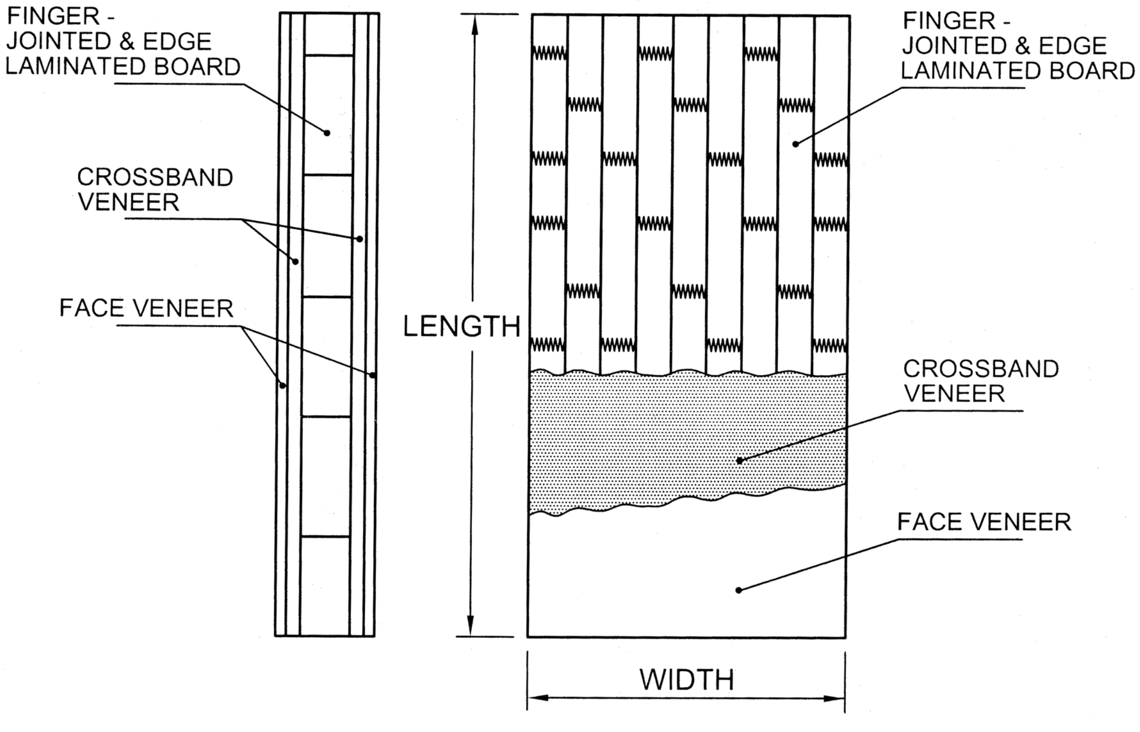
FINGER - JOINTED & EDGE LAMINATED BOARD
CROSSBAND VENEER
FACE VENEER
LENGTH
FINGER - JOINTED & EDGE LAMINATED BOARD
CROSSBAND VENEER
FACE VENEER
WIDTH

FIG. 1 TYPICAL VIEW OF VENEER OVERLAID VLL

4.3 Adhesive

Only BWP grade adhesive conforming to IS 848 shall be used for making veneer laminated lumber.

4.4 Preservatives

4.4.1 Veneers and timber used for veneer laminated lumber shall be given suitable preservative treatment before processing, with a preservative that is compatible with the adhesive to be used.

4.4.2 Fixed type of water soluble preservatives, CCA, CCB or non-leachable, solvent soluble preservatives as per IS 401 shall be used for treating the veneers.

4.4.3 Retention of preservatives shall be as per IS 401.

5 MANUFACTURE

5.1 Sawn timber shall be chemically treated as per IS 401 and kiln seasoned as per IS 1141 to moisture content not exceeding 10 percent.

5.2 The treated and seasoned plantation timber shall be finger jointed and edge laminated to the desired dimensions and shall be planned to the required sizes.

5.3 Veneer laminated lumber shall be directly manufactured to the nominal sizes of the components ultimately desired (allowing margin for final dressing and sanding) or in panels of larger length and width from which the desired size of components shall be obtained by appropriate sizing.

5.4 Phenol formaldehyde bonded finger jointed and edge laminated panel shall be cross bonded on both the sides using a glue core and a face veneer on either side, using a hydraulic hot press under controlled conditions of temperature, pressure and pressing time which depends upon the thickness of the composite. The stack under press shall then be cooled down to the room temperature by suitable cooling schedule for stabilization.

5.5 The pressed panels, if required to be stored shall be stacked flat and shall be ripped and cross cut to the required sizes.

6 DIMENSIONS

6.1 Dimensions of VLL supplied shall be inclusive of margin required for dressing and finishing over and above the size of finished components desired unless finished component (ready for painting) are ordered.

6.2 The margin for dressing and finishing shall not exceed 3 mm in the width and thickness and 12 mm in the length.

7 FINISH

Defective knots, when permitted on surfaces exposed to view, shall be completely bored or cut and tightly plugged with same timber species and properly glued in. The grain of the plug shall run in the direction of the piece.

8 SAMPLING AND CRITERIA FOR CONFORMITY

The method of drawing representative samples and criteria for conformity shall be as per laminated veneer lumber as per IS 7638.

9 TESTS

9.1 Moisture Content

The average moisture content of three specimens, when determined in accordance with IS 1734 (Part 1), shall be between 5 and 15 percent.

9.2 Density

The average density of three specimens, when determined in accordance with IS 1734 (Part 1), shall not be less than 0.6 g/cm³.

9.3 Resistance to Water

Three test specimens of size 150 mm x 150 mm shall be prepared from each of the boards selected under **8** and subjected to boiling in water for 8 h and dried for 16 h in hot air oven at a temperature of 65 ± 2°C and then followed by 5 more cycles of boiling and drying under the same conditions described above. The specimens shall be examined for delamination after the end of each cycle. The sample shall be considered as passed when no delamination is observed.

9.3.1 *Adhesion of Plies*

The specimens shall then be subjected to test for adhesion of plies in accordance with the method in IS 1734 (Part 5) and the fractured surface of the specimens shall show adherent fibres of at least 'pass standard'.

9.4 Modulus of Elasticity

Modulus of elasticity of three specimens, when tested according to the method given in IS 1659 shall have an average value not less than 5 000 N/mm^2 and minimum individual value not less than 4 200 N/mm^2. The length of each test specimen shall be of minimum 20 times the nominal thickness plus 100 mm.

9.5 Hardness Under Static Indentation

The average hardness on the face of the veneer of three specimens, when determined in accordance with IS 1708 (Part 10) shall not be less than 3 000 N.

9.6 Screw Withdrawal Strength

The average screw withdrawal strength of three specimens determined in accordance with IS 1708 (Part 15) shall not be less than 1 000 N on both the face and edge.

10 ADDITIONAL REQUIREMENTS FOR ECO-MARK

10.1 General Requirements

10.1.1 The veneer laminated lumber shall conform to the requirements of quality specified in this standard.

10.1.2 The manufacturer shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the provisions of *Water Prevention and Control of Pollution*) *Act,* 1974 and *Air* (*Prevention and Control of Pollution*) *Act,* 1981 and *Water* (*Prevention and Control of Pollution*) *Act*, 1977 along with the authorization, if required under the *Environment* (*Protection*) *Act*, 1986 while applying for ECO-Mark appropriate with enforced Rules and Regulations of forest department.

10.2 Specific Requirements

The veneer laminated lumber shall conform to the specific requirements given for ECO-Mark under relevant clauses of the standard.

NOTE — The manufacturer shall provide documentary evidence by way of certificate or declaration to Bureau of Indian Standards while applying for ECO-Mark.

11 MARKING

11.1 Each VLL piece shall be legibly and indelibly marked or stamped on the face near one corner with the following:

a) Name of the manufacturer or trade-mark;
b) Year of manufacture; and
c) The criteria for which the laminated veneer lumber has been labeled as ECO-Mark.

11.2 BIS Certification Marking

The veneer laminated lumber may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 DELIVERY

Unless otherwise specified, the veneer laminated lumber shall be delivered in good condition and shall be suitably packed according to normal trade practices.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
401 : 2001	Preservation of timber — Code of practice (*fourth revision*)
707 : 2011	Glossary of terms applicable to timber technology and utilization of wood, bamboo and cane (*third revision*)
848 : 2006	Synthetic resin adhesives for plywood (pnenolic and aminoplastic) — Specification (*second revision*)
1141 : 1993	Seasoning of timber — Specification (*second revision*)
1659 : 2004	Blockboards — Specification (*third revision*)
1708	Method of testing of small clear specimens of timber
(Part 10) : 1986	Determination of hardness under static indentation (*second revision*)
(Part 15) : 1986	Determination of nail and screw holding power (*second revision*)
1734	Methods of test for plywood
(Part 1) : 1983	Determination of density and moisture content (*second revision*)
(Part 5) : 1983	Test for adhesion of plies (*second revision*)
7638 : 1999	Methods of sampling for wood/ lignocellulosic based panel products (*second revision*)

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Wood and Other Lignocellulosic Products Sectional Committee, CED 20

Organization	*Representative*(*s*)
Indian Plywood Industries Research & Training Institute, Bangalore	Dr C. N. Pandey (***Chairman***)
Bamboo Society of India, Bangalore	Shri A. S. Sadashivaiah
Building Materials & Technology Promotion Council, New Delhi	Dr Amit Rai Shri D. P. Singh (*Alternate*)
Central Building Research Institute, Roorkee	Dr S. P. Agarwal Dr B. S. Rawat (*Alternate*)
Central Public Works Department, New Delhi	Shri A. K. Sharma Shri S. P. Choudhary (*Alternate*)
Century Plyboard India Ltd, Kolkata	Shri Ajay Baldava Shri Nikhilesh Roy Chowdhury (*Alternate*)
Coir Board, Bangalore	Shri M. Sudhakaran Pillai Shri R. Vasudev (*Alternate*)
Directorate General of Supplies & Disposals, Hyderabad	Additional Director General (QA)
Directorate of Standardization, New Delhi	Dr (Shrimati) Indu Gupta Shri G. K. Sharma (*Alternate*)
Engineer-in-Chief's Branch, New Delhi	Shrimati Mala Mohan Shrimati Shobana V (*Alternate*)
Federation of Indian Plywood & Panel Industry, New Delhi	Shri Jayadeep Chitlangia Shri Ajay Baldeva (*Alternate*)
Forest Research Institute, Dehra Dun	Director
Greenply Industries Limited, Kolkata	Shri Arabinda Saha
Housing and Urban Development Corporation, New Delhi	Shrimati Manju Safaya
Indian Academy of Wood Science, Dehra Dun	Dr O. K. Remadevi Shrimati Ravikala Kamath (*Alternate*)
Indian Plywood Industries Research & Training Institute, Bangalore	Shri Anand Nandanwar Shrimati Sujatha D. (*Alternate*)
Institute of Wood Science & Technology, Bangalore	Director
Jolly Board, Mumbai	Shri Arvind Jolly Shri P. K. Das Gupta (*Alternate*)
Kutty Flush Door & Furniture Co Pvt Limited, Chennai	Col Y. G. Krishnan Shri K. Shankarkrishnan (*Alternate*)
Ministry of Defence (DGQA), Kanpur	Dr (Shrimati) Geeta Nigam Shri Raja Ram (*Alternate*)
Ministry of Defence (R&D), New Delhi	Shri Ravinder Kumar
Ministry of Railways, Lucknow	Director Assistant Director (*Alternate*)
National Mission on Bamboo Application, New Delhi	Representative
National Test House, Kolkata	Shri Alok De Shri S. Thirumalai Kolundu (*Alternate*)
Northern India Plywood Manufacturers Association, Jalandhar	Shri N. K. Tiwari Shri Anil Goel (*Alternate*)
Nuchem Limited, New Delhi	Shri Sudev Barar Shri Arush Barar (*Alternate*)
Rajiv Gandhi Rural Housing Corporation Ltd,Bangalore	Shri Mahadeva Prasad
The South Indian Plywood Manufacturers Association, Chennai	Shri K. Sankarakrishnan
The Western India Plywood Limited, Kannur	Shri P. K. Mohamed Shri P. K. Mayan Mohamed (*Alternate*)

Organization	*Representative*(*s*)
Timpack Pvt Limited, Byrnihat	Director
BIS Directorate General	Shri D. K. Agrawal, Scientist 'F' and Head (Civil Engg) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri J. Roy Chowdhury
Scientist 'F' (Civil Engg), BIS

Wood, Other Lignocellulosic Based Building Boards and Speciality Wood Products Subcommittee, CED 20 : 6

Organization	*Representative*(*s*)
Indian Plywood Industries Research and Training Institute, Bangalore	Dr S. K. Nath (***Convener***)
A. B. Composite Private Ltd, Kolkata	Shri Sukanta Samanta Shri Avik Shee (*Alternate*)
Bharat Heavy Electricals Limited, Piplani	Shri S. K. Mahajan Shri Akshay Dave (*Alternate*)
Central Building Research Institute, Roorkee	Shri B. Singh Shrimati Manorama Gupta (*Alternate*)
Central Institute of Coir Technology, Kalavooor	Shri M. Sudhakaran Pillai
Central Public Works Department, New Delhi	Shri A. K. Sharma Shri S. P. Choudhary (*Alternate*)
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Defence R&D Organization, Kanpur	Shri R. K. Tiwari Shri Nusrat Ullah (*Alternate*)
Directorate General of Supplies & Disposals, New Delhi	Additional Director General (Qa)
Engineer-in-Chief's Branch, New Delhi	Shrimati P. Meenakshi Col N. A. Kumar (*Alternate*)
Federation of Indian Plywood & Panel Industry, New Delhi	Shri Arvind Jolly Shri Moiz S. Vagh (*Alternate*)
Forest Research Institute (Forest Products Division), Dehra Dun	Head of Department Dr S. P. Khali (*Alternate*)
Godrej & Boyce Manufacturing Company Limited, Mumbai	Shri Ega Venkateshwarlu Shri Chandrashekhar B. Baisware (*Alternate*)
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Indian Plywood Industries Research and Training Institute, Bangalore	Shrimati Sujatha D.
Institute of Wood Science and Technology, Bangalore	Dr Ajay Karmakar
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Jolly Board Limited, Mumbai	Shri Arvind Jolly Shri P. K. Das Gupta (*Alternate*)
Kerala State Bamboo Corporation, Cochin	Shri M. R. Anil Kumar
Kutty Flush Doors & Furniture Co Pvt Limited, Chennai	Shri K. Sankarakrishnan Col Y. G. Krishnan (*Alternate*)
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Novopan Industries Limited, Hyderabad	Shri S. A. Naqui Shri Suresh Kumar Reddy (*Alternate*)
Nuchem Limited, Faridabad	Shri Sudev Barar Shri Arush Barar (*Alternate*)

Organization	*Representative(s)*
The Gurdit Institute Pvt Limited, Dharwad	SHRI YASKARAN SINGH LAULY SHRI P. HOSMAI (*Alternate*)
The Mysore Chipboards Limited, Mysore	SHRI A. ANANTHACHAR
The South Indian Plywood Manufacturers' Association, Kottayam	SHRI K. SANKARAKRISHNAN SECRETARY (*Alternate*)
The Western India Plywood Limited, Kannur	SHRI K. P. KAMALUDDIN SHRI ANIL KUMAR (*Alternate*)

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